# Advancement of a Job- and Personal- Characteristics Placement Model

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Research toward validation of a comprehensive model mapping personal characteristics onto differentiated job characteristics for effective job outcomes is described. Increased effectiveness may operate via a more precise multivariate matching of person to job characteristics, resulting in increased subjective outcomes and effectiveness. Such improved matching should also reduce negative outcomes, thus mitigating intentions to leave. Results from 332 faculty, professionals, and clerical staff indicate differential outcomes can potentially be supported using varied combinations of personal characteristics in conjunction with given job characteristics. For this research, individual characteristics include Self-Monitoring, Locus of Control, Personality, and General Mental Ability. Job characteristics include autonomy, criticality, and routineness, and job outcomes include performance, job stress, and job satisfaction. Jobs were first categorized by characteristics. Factor and discriminant analyses both indicated categorical differences in job characteristics according to job categories. Multivariate analysis (canonical correlations) indicated the linear combinations of predictor and criteria variables differed both in terms of composition and loadings. Redundancy analysis indicated that approximately 6% to 18% of the variance in opposite linear combinations was accounted for by these predictor and criteria variables. Findings, therefore, generally support continued development and specification of a multivariate model, both for basic theory advancement and specific applications.

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# ABSTRACT

Research toward validation of a comprehensive model mapping personal characteristics onto differentiated job characteristics for effective placement, development, and retention of Navy personnel is described. Increased effectiveness may operate via a more precise multivariate matching of person to job characteristics, resulting in increased psychological, social, and physiological well-being, contentment with the job and work, extra-role behaviors, and effectiveness in tasks and in jobs. Such improved matching should also reduce negative outcomes, thus mitigating intentions to leave. Results from 332 faculty, professionals, and clerical staff indicate differential outcomes can potentially be supported using varied combinations of personal characteristics in conjunction with given job characteristics. Findings generally support continued development and specification of a multivariate model, both for basic theory advancement and specific applications.

# Advancement of a Job- and Personal- Characteristics Placement Model

A host of political, social, technological, and economic dynamics within the United States and across the globe in recent years has created a web of influences on the United States Department of Defense (DOD) and its various service arms. The effects have been far reaching, and can be grouped into several categories, three of which are noted here. One effect has been that the military mission is being redefined. The reduction in external security threats and concomitant conflagrations of various types around the world have demanded a different strategic and tactical definition of what is needed and how it is to be done. Another, effect of note is the technological explosion of recent years which has simultaneously facilitated a modified mission and challenged the human resources functions including selection, training, and retention, among others. A third effect is dramatic constraints upon the various resources needed, notably financial constraints of federal budgeting agendas and human resources constraints resulting from higher technological demands, tighter budgets, civilian competition, and so forth. Results of these influences include the need to respond to operations which are more divergent, have little geographical centralization, are of less predictable nature, that use more sophisticated technologies with fewer personnel, and are under more intense political and public scrutiny with shifting political and social objectives. A notable example of the DOD's response is the attention given to compensation structures to increase retention of valued human resources. The Fourth Quadrennial Compensation Review underscores the importance of these dynamics.

It seems apparent that, in such an environment, the theoretical and applied frameworks developed and applied to this point become severely constrained in their usefulness, and new approaches grounded in theory are required. Indeed, the compensation/retention research projects exemplify momentum in one particular facet of the several that are necessary. Compensation can obviously be an effective tool for recruitment, motivation, and retention, and using it in conjunction with other human resources tools seems to hold promise for helping achieve the redefined needs of the DOD and the Navy. Less attention, however, has been given to selection and classification advancements, which in turn, might ease the pressure on compensation as the primary retention and performance motivator. It is timely and appropriate then, to develop new models that will help to optimize recruitment, selection, placement, development, and retention of the Navy's human resources.

Basic requirements of such models seem rather straight forward. What is needed are theory-based applications that result in having the right people in the right places, with reasons to perform consistently for desirable periods of time. One relatively unexplored, yet intuitively and scientifically appealing approach to meeting these conditions is a rigorous and detailed mapping of the various dimensions of individual characteristics onto the various dimensions of job characteristics. Substantial research exists in both areas, but a multivariate mapping approach has not been adequately explored. There has been notable work that has made inroads toward integrating these areas with into this area, such as Holland's (1973) interest inventories, the Department of Labor's (DOL) Occupational Information Network (Onet), and extensive work with such instruments as the ASVAB Series. As will be more fully discussed below, these efforts have generally emphasized a very limited scope of either individual or job characteristics.

A more complete perspective of the individual-job relationships needs to include not only who can do the job, but who is better suited to job conditions in terms of preferences and response tendencies in addition to knowledge, skills, and abilities (KSAs). Such an approach needs to consider a broader set of influences, such as social, personality, and cognitive psychology, human factors, and organizational behavior. Examples of individual characteristics that are relevant and appropriate include such constructs as: Locus of Control, Self-Monitoring, various dimensions of personality, cognitive ability, values, achievement needs, affectivity, experience, and emotionality. Additional challenges to such an approach emerge when we consider that some individual constructs tend to be stable while others are more susceptible to contextual factors. The latter often can be influenced by interventions such as training.

An initiative such as proposed here also requires a broad-based approach to job characteristics, and should include factors such as task characteristics, social factors, technological factors, information management, dynamism, autonomy, accountability mechanisms, criticality, and so forth. One notable characteristic of some of these factors is that, for some individuals, they might be a source of stress which could result in psychological or physiological strains, while for other individuals, these same factors could be invigorating and challenging, resulting in higher esteem, efficacy, satisfaction, and so forth. These different outcomes could occur between individuals equally capable and productive in a given job.

These notions can be coalesced and developed into a comprehensive model of human resources placement. This model, depicted below, includes multiple personal characteristics, job characteristics, and work outcomes, and further includes the role of interventions and recognizes the importance of evaluating behaviors in conjunction with abstractions.

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Such a comprehensive perspective serves to focus research efforts and provide a long term research agenda. Empirical support should proceed in an orderly fashion, first by establishing viability through verification of key linkages and by incrementally testing portions of the model. Following are discussions of major components of this proposed model.

## Individual Differences Research

Individuals differ significantly in terms of the abilities and personality/dispositional traits that they possess. Jobs also differ in terms of their requirements and demands. A good fit between the individual and the job has important consequences for employee performance/effectiveness, satisfaction, and retention. A variety of selection devices exist that are designed to assess important individual difference variables; but in recent years, increasing attention has focused on the use of two general classes of predictors – cognitive ability tests and personality/dispositional tests (e.g., Cascio, 1995; Wagner, 1997).

### Cognitive Ability Tests

Cognitive ability, or general mental ability (GMA), tests are among the most predictive selection devices available. The results of a number of recent meta-analyses, as well as the results of large-scale studies of military personnel have provided strong evidence of the predictive validity and overall utility of cognitive tests for a wide range of jobs and occupations (e.g., Hunter & Schmidt, 1983; McHenry, Toquam, Hanson, & Ashworth, 1990). Some scholars have speculated that cognitive testing will assume an even more critical role in organizational success in the near future. Accelerated global competition, more complex technology, more fluid organizational forms, and radical changes in the nature of work and the design of jobs would seem to require workers that are more capable, competent, and able to learn (Cascio, 1995).

### Personality/Dispositional Tests

While cognitive ability tests may represent the single most predictive type of selection device available, there is a growing sense of the need to look beyond cognitive abilities for other noncognitive predictors of performance. Quite recently, research on the use of personality measures in the selection process has increased substantially (Borman, Hanson, & Hedge, 1997; Wagner, 1997). In the past, some scholars have questioned the validity and usefulness of personality tests. Better measures and better methods of estimating the usefulness of personality tests, however, have led to a revision of thought. Recent meta-analyses of some personality variables have produced some impressive estimates of their validity in predicting performance (Barrick & Mount, 1991; McHenry, Hough, Toquam, Hanson & Ashworth, 1990; Tett, Jackson, & Rothstein, 1991).

Personality measures may become even more useful and predictive of performance in the near future. As previously mentioned, organizations seem to be moving toward new, more fluid ways of structuring themselves. Concomitantly, the nature of work (and the concept of a "job") is changing radically. Additionally, there is an increased emphasis on teams and workgroups. Successful performance may increasingly depend on the possession of personality characteristics such as adaptability, sociability, emotional stability, and the ability to work well with others (Cascio, 1995).

Another argument in favor of the use of personality measures is that they are typically uncorrelated with cognitive ability; thus, the use of personality tests has been found to increase the prediction of job performance above and beyond that predicted by cognitive tests alone (Day & Silverman, 1989). The combined use of cognitive ability tests and personality tests may contribute to the maximal prediction of successful performance for many organizations. Given the potential usefulness of personality testing, some of the more important dispositional variables are briefly reviewed.

The Big-Five personality dimensions. A good deal of attention has recently centered on the use of the so-called Big-Five personality dimensions in selection (Barrick & Mount, 1991). The first of the five dimensions is Extraversion. Traits associated with this dimension include being sociable, gregarious, assertive, talkative, and active. The second dimension is called Emotional Stability, or Neuroticism from a reverse-scored perspective. Traits typically associated with this dimension include being emotional, tense, insecure, nervous, excitable, apprehensive, and easily upset. The third dimension is termed Agreeableness, and is associated with being courteous, flexible, trusting, good-natured, cooperative, forgiving, soft-hearted, and tolerant. The fourth dimension is termed Conscientiousness. It is associated with being responsible, organized, dependable, planful, willing to achieve, and persevering. The fifth dimension, Openness to Experience (or Openness), includes being imaginative, cultured, curious, intelligent, artistically sensitive, original, and broad-minded. Barrick and Mount (1991) conducted a meta-analysis of 117 validity studies across five occupational groups and three different criteria. Their study found that Conscientiousness was a valid predictor for all occupational groups, and for all three criteria. They also found that Extraversion and Neuroticism were valid predictors for some (but not all) occupations. A recent study by Salgado (1997) found that Conscientiousness and Neuroticism were valid predictors across a variety of occupational groups and job criteria. Of particular importance to this proposal, the three remaining dimensions were valid only for some occupations and some criteria. A meta-analytic review by Tett, Jackson, and Rothstein (1991) also provided strong support for the use of the Big-Five personality dimensions. In fact, in their study, they found that all five dimensions were highly valid predictors of performance. In sum, the use of the Big-Five appears to offer much promise toward improving our ability to identify and select successful performers.

Locus of Control. The personality variable termed Locus of Control (LOC) has been found to be a useful predictor of behavior in organizations. This variable relates to an individual's perception of who or what is in control of one's life. Those who have an internal LOC believe that they are the masters of their own fate. Those who have an external LOC believe that events that occur in their lives are due to fate, luck, chance, or divinity (Rotter, 1966). These differing orientations have implications for performance, satisfaction, absenteeism, work alienation, and job involvement. In general, the evidence suggests that internals perform better in most work settings; however, some types of jobs appear to be better matched to one orientation or the other. For example, internals (who more actively search for information, and attempt to control their environment) are thought to be better suited for jobs that involve more sophisticated tasks where complex information processing and learning are required. Internals are also thought to be better suited for jobs requiring more initiative and independent action. On the other hand, externals are thought to be better suited for jobs that are more routine and structured, and where successful performance entails complying with the direction of others (Rotter, 1966; Spector, 1982). Research has also found that externals exhibit lower job satisfaction, higher absenteeism, greater alienation, and lower levels of job involvement than internals (Keller, 1983; Spector, 1982). Thus, LOC may represent another potentially useful personality variable.

Self-Monitoring. Another personality variable that has received increased attention is Self-Monitoring (SM), which refers to an individual's ability to adjust or adapt his or her behavior to external or situational factors. High self-monitors are quite adaptable, and can behave very differently in different situations because of their enhanced sensitivity to external cues. Conversely, low self-monitors are quite consistent across situations, and tend to display their true feelings and attitudes in every situation (Snyder, 1987). Little research has been conducted, to date, on the relationship between SM behavior and job performance. However, it would seem that high self-monitors would be better suited for jobs that require the individual to play different, and perhaps contradictory roles. Some jobs require an individual to put on a different face for each of a number of important audiences. The high self-monitor would seem to be the ideal candidate for such a job. Clearly, more research on this dispositional variable is warranted. SM may eventually be shown to be a very important predictor of success for some types of jobs.

## Job Characteristics

Studies of the characteristics of jobs have a long history in the personnel and human resources literature. Beginning with the efforts of Frederick Taylor and the scientific management research, there has been a concerted effort to understand what constitutes jobs, usually for one of two reasons. The first agenda was essentially to determine who could do the job, and how to get it done faster. A subsequent research agenda embraced notions of individuals as social entities who desire their work to meet personal and social needs. A notable example is the Job Characteristics Model of Hackman and Oldham (1976), which was concerned with designing jobs to accommodate individuals needs according to a unidimensional perspective of people varying on an internal need for personal growth.

Convergence of these two themes (i.e., selection/efficiency and intrinsic motivators) resulted in a body of selection research that focuses on matching individuals' knowledge, skills, and abilities (KSAs) to the jobs' requisite tasks, duties, and responsibilities. This matching could be facilitated by training when KSAs are learnable, and applicants have an aptitude for such training. This matching agenda resulted in the development of the Dictionary of Occupational Titles (DOT), a comprehensive compilation of jobs into families, categorized by three types of job activities. These categories were used to convey the nature of the job in terms of the levels of dealing with data, people, and things, again with the purpose of matching individual KSAs with job requirements.

This work is being extended to encompass a much broader range of job characteristics by the DOL's Onet. The intent is to create a substantial database accessible via the World Wide Web for the purpose of facilitating the ability to match individual KSAs to job market openings. The Onet database is built on a content model that incorporates worker characteristics (KSAs, education, and experience) and occupational requirements. The occupation requirements model is indeed extensive, and may be useful in offering variables for preliminary testing of the general model introduced above.

The occupation requirements are listed to four levels of specificity. At the most general level, there are two types of characteristics; generalized work activities (general types of job behaviors) and work context (physical and social influences on the nature of the work).

Several theories and models related to work activities are incorporated into the data model. These include several perspectives of how we seek, receive, process, and store work information, how we interact with others and with our work, the Job Characteristics Model (Hackman & Oldham, 1976), human resources functions, goal setting, role theory, organizational culture, Leader Member Exchange, communications, physiological factors, organizational social factors, and work routine elements, among others. While this is a rather comprehensive perspective of work, an alternative perspective of job characteristics is that of those desired by employees. One model of this is the Occupational Classification Model of Holland (1973).

Holland's (1973) Occupational Classification Model classifies work into six categories commonly of interest to employees. These are realistic, investigative, artistic social, enterprising, and conventional, and the model is often referred to by the acronym RIASEC.

Even a cursory read of the variables and characteristics reviewed here suggest that an evaluation of a person-job match based on KSAs, experiences, education, general aptitudes, or interests is likely inadequate given the relationships of individual differences and work outcomes discussed earlier. For example, consider a job high in autonomy, where there is little direct supervision, and the individual has broad decision and scheduling latitude. Research has demonstrated an interaction of Conscientiousness and autonomy (Barrick & Mount, 1993), indicating that people low in Conscientiousness may be less effective. Consider a second example in which the individual is responsible, and accountable, for setting goals when accountability is for goal-setting. A recent study indicates that more conscientious people may more selectively apply their efforts when accountability is not for specific work outcomes (Frink & Ferris, 1999). Thus, jobs which entail high accountability for goal setting may be better suited for lower Conscientiousness individuals. Or, consider a third situation in which responsibilities require working closely with a limited group of individuals in critical jobs over a protracted period of time. High self-monitors better regulate emotive reactions, and thus may function better in such contexts especially over time.

Embedded in these examples is not only the notion of higher performance over time, but also, such matching of individual and job characteristics may result in better adaptation, socialization, and transfer of training in addition to lower levels of dysfunctional felt stress and longer tenure in a particular job, or job family. Research has not yet rigorously explored the multivariate nature of personal and job characteristics. Another fundamental issue here pertains to the desirability of various job outcomes. Organizations often find themselves in environments that are dynamic enough in to require combinations of performance, satisfaction, tenure, or reduced anxiety to differ in priority. Thus, a multivariate model would seem appropriate for investigation.

## Proposed Initial Investigation of Portions of Model

As has been noted earlier, there has been a wealth of research describing behavioral constructs and their influences on work outcomes, and this research has often focused on general performance measures. Concomitantly, there has been a wealth of research into characteristics of jobs. We have also noted the potential to integrate these literatures into a theoretical framework which matches individual and job characteristics. Such an endeavor would indeed be a monumental effort, but such an effort is needed. An appropriate means for investigating these relationships is to select job and worker characteristics that have demonstrated interrelationships, and test the model in an incremental fashion.

The primary goal of the proposed research is to establish the viability and utility of the model by verifying linkages between specified subsets of the domains in a multivariate analytical model. Specifically, we propose to investigate the relationships between sets of individual characteristics and sets of performance outcomes given specified sets of job characteristics in this initial effort. An ongoing strategy for this research stream, given the findings of the present research, is to extend those findings by broadening the variables in the personal characteristics and job characteristics domains, then generalizing the findings from specific jobs to jobs which are related in terms of the characteristics identified as key to this approach. The next step is to further define the personal characteristics in terms of stability so that the training portion of the model may be included, and additionally identify behavioral indicators of future performance in terms of the multivariate model (rather than previous univariate models).

### Individual Characteristics

Individual characteristics to be measured include LOC (Rotter, 1966), SM (Snyder, 1974), GMA, and the Big Five personality factors (McCrae & Costa, 1987). These were selected specifically from a broad range of potentially useful constructs for two general reasons.

First, these four constructs have theoretical linkages, and have consistently demonstrated empirical relationships with various work outcomes from productivity and efficiency to job satisfaction. Furthermore, these constructs have been shown to be related to job characteristics in producing these outcomes. Therefore, as a set of constructs, they are likely to be useful in initially establishing the viability of the linkages within the proposed omnibus model.

Second, in considering characteristics foreseen for Navy jobs and the conditions under which Navy personnel are more and more likely to work, these constructs seem especially applicable. In considering the trend toward higher levels of technology and smaller crews, it seems apparent that certain personal attributes are likely to be useful. For example, if Navy ships have crews of 50-100 instead of the hundreds currently in similarly-missioned ships, such factors as attention decrement and social behavior patterns may be critical for efficient and effective operations over time. It seems reasonable to expect a relationship between LOC, which refers to whether we find support for decisions internally or externally, with effectiveness over time in a context where conflicting information is coming from numerous sources, and with more autonomy, as might occur aboard a smaller-crewed vessel. Similarly, it seems reasonable to expect a relationship between SM, which refers to the tendency to track and modify our own interactions with our environments, and long-term effectiveness in a similar context. Alternatively, the same internal LOC may be useful for combat pilots, but the self-attentiveness might be a distraction.

Thus, the individual characteristics framework used for selection generally implies that four constructs in particular seem relevant. Recent personality research has strongly supported relationships between work outcomes and personality dimensions, notably Conscientiousness and Agreeableness. Furthermore, research has found moderator variables which influence the personality-work outcome relationship. Thus, using personality as one construct for initial model testing is reasonable, and, specifically, the Five-Factor model is employed (McCrae & Costa, 1987).

Research into generalized predictors of work performance has suggested that a vector of general cognitive ability scores (GMA) is a singular valid predictor. It is reasonable to conclude that specific dimensions of GMA would be useful in predicting specific performance dimensions. The Department of Defense and its agencies currently use the ASVAB for such purposes. Further research into the applicability of ASVAB dimensions for specific job characteristics in a multivariate model with other constructs is reasonable for extending this proposal.

A third construct that has been found to influence work behaviors is LOC (Rotter, 1966). This construct has been shown to moderate relationships of a broad variety of contextual factors and work outcomes. Noting the similarity of several of these contextual factors and Naval jobs suggests that LOC is a third construct appropriate for inclusion in initial model testing.

Finally, as noted above, SM (Snyder, 1974) is conceptually related to work outcomes, and, furthermore, seems particularly relevant when considering our perspective about the future of the Navy's mission and methods. SM is especially notable because of its relationships with interpersonal interactions and the means one uses to interact with their environments, issues of particular interest in technology intensive and small group oriented jobs.

### Job Characteristics

Unlike the individual characteristics literature, the job characteristics literatures have been better coalesced into a model, as noted above in discussing Onet. A number of these variables have potential to provide eustress or distress, or to be motivating or demotivating, satisfying or dissatisfying, rewarding or unrewarding, to various individuals. Furthermore, it seems likely that combinations of these variables may indeed exclude some individuals from being effective or proficient in their jobs. In addition, persons may tend to remain in one job, or within a family of jobs for shorter periods of time if they are mismatched with job characteristics. We propose that the work characteristics of autonomy, routineness, and criticality have utility because they have previously demonstrated relationships with individual-level characteristics and because of their relevance to the Navy's changing mission and operations. This is further developed below.

As noted earlier, a Navy that is more dependent on applications of technology and less dependent on raw numbers of personnel suggests a different nature to many jobs, but little change to others. Having ships that are manned by small crews seems to suggest that many positions will be substantially more autonomous, as one person would occupy the same production space that several persons previously occupied. It also is possible that hierarchies will be reduced, and flatter organizational structures might exist in such contexts. For that reason, autonomy was included.

Another dimension deemed important for future operations is routineness for similar reasons. As more operations are centralized to fewer individuals, and as technological applications replace personnel, it seems likely that many jobs may be quite routine. This is because the nature of technology is that the mathematical algorithms which deliver and enact instructions are relatively consistent, and in order for a single individual or a team to monitor numerous operations, routineness in those operations may be important to maximize ability to detect deviations, to minimize the cognitive resources required for any single operation, and to maintain the stability of the systems. Alternatively, other jobs may see reduced routineness, such as the technology maintenance staff. It is conceivable that constructs such as SM or Openness to Experience might have differential implications for how one responds to routineness.

The third variable selected for this research is the criticality of the job. Fewer personnel and increased use of technology suggests that some jobs will increase in the criticality of performance by the incumbent. This has potential to be a source of stress that potentially will reduce tenure and effectiveness for some individuals, while others may remain unaffected or even psychologically aroused and challenged by doing more critical work. It is thus highly likely that both performance and retention are related to the criticality of the job. Each of the personal characteristics variable types we have discussed are likely to be related to the level of criticality of the job, and therefore it is seen as an important variable to add to the analysis.

### Work Outcomes

Numerous work outcomes are tenable as dependent variables for initial testing of proposal model linkages. Three, however, seem particularly germane to current USN initiatives. These include effectiveness in job (i.e., job performance), job satisfaction, and job anxiety.

## Method

### Sample

The sample for this research consists of incumbents in three different jobs. Optimally, the jobs analyzed should be of divergent characteristics to allow sufficient variance to extend the research efforts in future investigations. However, two problems were encountered. First, there were difficulties in gathering data from Navy personnel per the original proposal, making using such a sample unworkable. Second, resultant time constraints precluded finding an organization willing to grant access to a) adequate numbers of personnel having divergent job characteristics, and b) the personnel records for those individuals. Therefore, employees at the University of Mississippi within three general job types were surveyed. State law prohibits access to personnel files, thus all information is self-reported, with concomitant validity limitations. In addition, the use of an alternative organization meant using an alternative means of collecting information for some variables from the original proposal, and additional costs for purchase of the measure were absorbed by the investigators.

A total of 1530 employees at the University in three job categories were surveyed. These categories include faculty, skilled and professional employees, and clerical staff. The surveys used were rather lengthy, and incentives were deemed appropriate. For these purposes, the skilled and professional employees were divided into two groups, producing four groups. For each group, a $500.00 cash award was offered to a single respondent, who was selected by random drawing. There were 332 respondents, resulting in a 22% response rate, which is typical for unsolicited survey research, and somewhat high for lengthy surveys. The final sample consisted of 81 faculty (24%), 151 professionals (46%), and 98 clerical staff (30%). Average age was 41.34 (s.d. = 10.80), average education was 17.67 years (s.d. = 4.91), and 64% were females.

Surveys were distributed to all employees in the relevant job categories via campus mail using employee lists obtained from the Human Resources Department. The packets that were sent to the employees contained survey forms, answer forms, return envelopes, and cover letters indicating assurances of confidentiality and appropriate disclaimers that noncompliance carried no penalties. The cover letters and surveys also informed the employees about the cash awards to incentivize responses.

## Measures

### Individual Characteristics

The individual characteristics variables for the proposed research were measured using well-established metrics. LOC was measured using Rotter's (1966) scale, SM was measured using Snyder's (1974) scale, and personality dimensions were measured using the NEO-PI which was developed and validated by McCrae and Costa (1987). Cognitive ability (general mental ability: GMA) was measured using the Shipley Institute of Living Scale (SILS) (Zachary, 2000).

Locus of Control. LOC is measured using 23 pairs of sentences, and respondents select which of the pair they most strongly believe to describe themselves. The sentence pairs generally contrast beliefs about the source of behavioral reinforcement, whether people have control over events and results for themselves or whether they have little control and are subject to luck or happenstance. Higher scores indicate the latter, that external forces have a determining effect on outcomes for individuals. The range is between 0 and 23, and the mean for this sample was 10.32 (s.d. = 4.23).

Self Monitoring. SM is measured using 25 statements to which the respondents indicate whether the statement is true or mostly true for them, or whether it is false or mostly false for them. Sample statements include "I find it hard to imitate the behavior of other people (reverse scored)," "I can only argue for ideas which I already believe (reverse scored)," "I'm not always the person I appear to be," and "I have trouble changing my behavior to suit different people and different situations (reverse scored)." The range is between 25 and 50, and the mean for this sample was 31.61 (s.d. = 8.14).

Personality. Personality variables were measured using the NEO-FFI (Costa & McCrae, 1992). Each subscale contains 12 items, and are scored on a 5-point Likert-type scale using Strongly Disagree and Strongly Agree as anchors. Sample Agreeableness items include "I try to be courteous to everyone I meet," "I tend to be cynical and skeptical of others' intentions (reverse scored)," and "Most people I know like me." The range is from 0 to 48, and the mean for this sample was 32.50 (s.d. = 5.41). Sample Conscientiousness items include "I am not a very methodical person (reverse scored)," "I keep my belongings neat and clean," "I never seem to be able to get organized (reverse scored)," and "I strive for excellence in everything I do." The sample mean was 34.90 (s.d. = 5.39).

Cognitive ability. GMA was measured using the SILS (Zachary, 2000), which has two components to assess verbal and abstraction ability. The verbal component consists of a list of 40 words, each having four words listed beside it. Respondents select the word that means the same thing, or nearly the same thing. Examples include "TALK: draw, eat, speak, sleep," "SMIRCHED: stolen, pointed, remade, soiled," "DENIZEN: senator, inhabitant, fish, atom," and "PARIAH: outcast, priest, lentil, locker." The abstraction component consists of 20 pattern completion items. Respondents are given series of letters and/or numbers, and the task is to fill in a number of blank spaces that complete the pattern. Sample items include "white black short long down up," "A Z B Y C X D W," "3124 82 73 154 46 136," and "two w four r one o three r." The SILS was originally developed in 1940, was revised in 2000, and has been validated both as a measure of general cognitive functioning (i.e., an intelligence measure) and as a performance predictor, among other applications.

As a measure of cognitive functioning, it has been validated against the Wechsler Adult Intelligence Scale (WAIS: Wechsler, 1955) and Wechsler Adult Intelligence Scale -- Revised (WAIS-R: Wechsler, 1981), with correlations ranging from .73 (n = 91) to .90 (n = 30). Age adjusted tables can be used to estimate WAIS and WAIS-R scores. As a performance predictor, the SILS has been used, for example to predict air traffic control selection screenings and academy performance (Della Rocco, Milburn, & Mertens, 1992). The range of SILS scrores is from 0 to 80, and the mean score was 67.95 (s.d. = 9.72). Given an average age of 41.34 years, this translates to an estimated average WAIS (i.e., IQ) score of 109.

## Job characteristics

Job characteristics were assessed by combining items from previously validated job characteristics instruments and investigator-generated items. These included items about the three job characteristics of autonomy, routineness, and criticality from the incumbents' perspectives. The instruments used included Hackman and Oldham's (1976) Job Diagnostic Survey (JDS) and the Position Analysis Questionnaire (PAQ: Mecham, McCormick, & Jeanneret, 1977).

The JDS (Hackman & Oldham, 1976) contains 21 items which assess jobs along seven dimensions: Dealing with others, autonomy, task identity, skill variety, task significance, feedback from agents, and feedback from the job itself. There are three items for each dimension, and they are scored on a 5-point Likert-type scale anchored with 1 = Not at all, and 5 = Very much so. The PAQ (Mecham, McCormick, & Jeanneret, 1977) consists of 194 items addressing a wide variety of job characteristics. It was developed in conjunction with the Office of Naval Research (Personnel and Training Research Programs Branch), and has been used to classify a broad variety of job types. For the current research 17 items relating to job demands, responsibility, structure, and criticality were included in the surveys. The items are scored on 5 point scales of varying formats. Some are Likert-type scales anchored from, for example, very low to very high or none to almost continuously. Others use descriptive scales in which each of the five degree points are accompanied with a descriptive sentence conveying the nature of that level.

In addition to using these two instruments, the investigators developed 18 items to further assess job characteristics such as routineness, creativity, interdependence, and information dependency. The last two characteristics were included because of possible correlations with autonomy and criticality, and because the nature of Navy jobs is increasingly reflecting those characteristics, often in conjunction with one another. Eight items asked respondents to rate their jobs on a scale from 1 to 5, with five being the most, and ten items were scored on 5-point Likert-type scales with 1 = Strongly Disagree and 5 = Strongly Agree. Sample items include "On a scale from 1 to 5, with 5 being the most, how critical is your job? Consider how much others spend on what you do, and how others' work, safety, success, and security depend on your diligent and accurate work," and "My job is so routine, I could do it in my sleep (Likert-type scaled)."

To construct the scales for this research, the relevant items from these three sources were first factor analyzed using maximum likelihood extraction with varimax rotation. Three factors were retained because there are three job characteristics of interest (i.e., autonomy, routineness, and criticality). Items loading less than .40 on the appropriate factor were deleted, as were items with two factor loadings less than .15 apart (to minimize multicollinearity). The resultant scales consisted of eight item measures for routineness and criticality, and a five item measure for autonomy. Each scale used combinations of items from the three sources, with the exception of criticality, which did not contain a PAQ item. Scale reliability analysis resulted in coefficient alpha internal consistency reliability estimates for autonomy, routineness, and criticality of .70, .88, and .76 respectively.

Because job classifications for the present research are categorical, and because the model assumes that job characteristics differ categorically for the jobs of interest, further analysis was undertaken to support using the job categories for categorizing job characteristics in the canonical correlation analysis to follow. The concern here is to ascertain that the job categories substantively differ in terms of job characteristics. This is necessary for category-level analyses to be meaningful. First, a one-way ANOVA was estimated using to assess mean differences in the job classifications according to the job characteristics of interest. Results indicated that mean values differed significantly among job categories, and are included in Table 1. Interestingly, and useful for the present research, each job classification was dominated by a particular job characteristic, and the order of importance of the three variables differed by job category, as illustrated in the table.

Subsequent to the ANOVA, discriminant analysis was performed to test the differential classification of individuals using these variables to correctly assign job categories to individuals. Results indicate that 58% of respondents were correctly classified via these variables. Thus, there is enough variance among job categories to analyze them independently.

### Work Outcomes

The three work outcome variables used (i.e., performance, job satisfaction, and job anxiety) were measured using self reports because personnel data is not allowed to be distributed by state law.

Job performance. Performance is difficult to measure in any fashion, and self reports are viewed as perhaps the poorest method for performance measurement. However, reasonably valid assessments can be made with the use of benchmarking or contrasting features in the assessment instrument. These benchmarks can be some objective standard or a contrast against others. Such things as hours worked per week, perceptions of work performed beyond the job requirements, and reports of supervisory ratings are potential means. In this study, respondents were asked to respond to questions about how much work they did that could or should be rewarded but was not, and how much work they performed beyond their job description or typical expectations for someone in their job. Responses were on a 6 point scale that categorized percentages from 1 =

0% to 6 = >20%. The possible range, therefore, was 12, and the mean was 7.81 (s.d. = 2.88). The coefficient alpha internal consistency reliability estimate was .65.

Job Satisfaction. Job Satisfaction was measured using the Job In General satisfaction subscale from the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969). This subscale contains 24 items to which the respondent indicates whether or not they fit the job. It is scaled from zero to two, with 0 = No, 1 = Yes, and 2 = Undecided. This is a natural approach to scaling for individual responses, and has been shown to elicit reliable satisfaction scores. Sample items include "Comfortable", "desirable", "rotten" (reverse scored), "worthwhile", and "would like to leave" (reverse scored). The items were rescored so that low scores indicate dissatisfaction, middle scores indicate undecided, and high scores indicate satisfaction. The range is from 24 to 72, and the mean was 57.31 (s.d. = 14.05).

Job Anxiety. Job Anxiety is often a precursor to poor performance and turnover in addition to health problems. It was measured using the State Anxiety subscale from the State-Trait Anxiety Index developed by Spielberger, Gorsuch, Lushene, Vagg, and Jacobs (1983). The essential qualities assessed by STAI involve feelings of tension, nervousness, worry, and apprehension. The scale consists of 20 items, some examples being: "I feel tense," "I feel nervous," "I feel anxious." Respondents were asked to indicate how they felt in connection with their job or work at the present. The responses were measured using a 4-point Likert-type scale (1 = not at all; 2 = somewhat; 3 = moderately; 4 = very much so). The scale range is from 20 to 80, and the mean was 34.14 (s.d. = 9.99). The coefficient alpha reliability estimate for the STAI scale was .92.

## Results

### Bivariate Correlations

Intercorrelations of all variables are shown in Table 2. It is notable that the correlations generally are in the directions that theory would predict (e.g., Job Anxiety negatively correlated with Job Satisfaction), and that, in general, correlations are not high. The latter is likely when bivariate comparisons omit relevant information, such as this model suggests. This is typical in social science research.

## Canonical Correlation Analysis

Analysis of the data was conducted by the canonical correlation method. Canonical correlation analysis is appropriate in situations where a set of predictor variables is related to a set of criterion variables. Furthermore, canonical correlation analysis permits simultaneous assessments of relationships that otherwise must be investigated separately. Because there are several desirable outcomes from employment relationships, it follows that there are clear advantages in considering them as interrelated rather than independent. Canonical correlation analysis facilitates this process. In this case, there are three sets of variables to consider, job characteristics, individual characteristics, and job outcomes. Job characteristics are considered as being fixed within jobs (although individual perceptions may vary). Because we are investigating the relationships of individual characteristics and job outcomes given the job characteristics, separate analyses will be conducted for each job. Thus, interpretations may be in terms of "Given the characteristics of this job, these individual characteristics have a stronger relationship with these job outcomes."

The canonical correlation procedure is a form of factor analysis. Similar to factor analysis, it constructs linear combinations of variables, but from each side of the equation, and these are called variates. The maximum number of variates is the lowest number of variables on either side of the equation (i.e., three in the present research). The canonical correlation coefficient is the correlation between the paired linear combinations (i.e., variates). Canonical coefficients are analogous to beta weights in regression analysis, and represent the relative contribution of the variables to that particular variate. These coefficients are highly susceptible to multicollinearity, and interpretation is guarded. Canonical loadings represent the zero order correlation between the variables and the variates. Thus, comparisons are not between individual variables, but either between variates, or between variables and variates.

Therefore, the variables used for the canonical correlations were the individual characteristics (i.e., the predictors) and the job outcomes (i.e., the criteria). Table 3 displays the results of the canonical correlation analyses including the canonical coefficients and canonical loadings, and Table 4 displays the cross loadings and redundancy analysis.

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Insert Tables 3 and 4 and about here.

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There are four analyses included in the tables, the whole sample and the three subsamples. The whole sample results are included for the convenience of the reader, and are not discussed in detail. The focus is the category level analyses, to which we turn now. The tables indicate notable differences in canonical correlation values across analyses, and, in general, values are high enough to warrant further analysis. The eigenvalues offer information about the amount of variance in one variate that is accounted for by its related variate from the other set. For example, the first canonical correlation for the faculty subsample indicates that the first variates are correlated at .521, and the accompanying eigenvalue indicates that 27% of the variance in the first criteria variate is accounted for by the first predictor variate (or vice versa). This is notable, and offers more information when the criterion variates are evaluated in terms of the variable that dominates them. The table indicates that the first variate from the predictor sets accounts for approximately 27%-40% of the variance in the first variate from the criterion sets, and the subsequent eigenvalues indicate a range of approximately 6%-21% and 5%-12% of variance in predictor variates accounted for by criteria variates for second and third variate pairs. In performance prediction models, these represent a nontrivial proportion of outcome variance.

The next sections of the tables indicate differential canonical coefficients for the variates across samples. For the whole sample, the first criteria variate is dominated by Job Anxiety (as for all subgroup analysis), the second by Performance, and the third by Job Satisfaction. For the faculty subsample, Job Satisfaction dominates the second variate, and Performance the third.

The professional subsample reflects a the ordering of the whole sample, and the clerical subsample ordering mirrors the faculty subsample. The canonical coefficients for the criteria sets also indicate that, in most cases, a single variable does not overwhelmingly dominate the criteria variates. For example, the first criteria variate in the faculty subsample has canonical coefficients for Job Anxiety and Performance of .754 and -.706 respectively, indicating multiple criteria effects for that variate. Similar relationships are evident for other variates and subsamples as well. This finding aligns with the basic tenets of the model, that differing job characteristics are reflected with differing personal characteristics such that multivariate relationships can be observed and used. That is, a univariate analysis fails to adequately inform of the range of outcome relationships with predictors. In addition, this finding indicates that the predictor variables included in this analysis are better at predicting varied outcomes across jobs, a point which will become increasingly clear and better delineated in subsequent portions of the analysis. It will be important to recall which criterion variable dominates the variates in later stages of the analysis. Beyond this simple assessment, the canonical coefficients have limited utility because of the correlated errors that are inherent in canonical correlation analysis.

The canonical loadings for the predictor set represent the simple correlations between the predictor variables and the predictor variates. These loadings are also analogous to factor loadings, with the exception that whereas a .40 loading is considered the lower bound for a variable for retention in factor analysis, commonly a .30 loading is considered the lower bound for utility in canonical correlations (Dillon & Goldstein, 1984). They indicate the relative contributions of the predictor variables to the predictor variates. For the whole sample, the first criterion variate is dominated by Job Anxiety, and its counterpart among predictor variates indicates LOC, Agreeableness, Conscientiousness, Neuroticism, and Openness are the notable contributors to the predictor variate. As noted above, the first variate in all subsamples are dominated by Job Anxiety, and the canonical loadings reflect a variety of patterns. For the faculty subsample, SM (negative), Neuroticism, and Extraversion (negative) load on the first variate. For the professional subsample, only GMA and SM do not load on the first variate, and only SM and Extraversion do not load on the first variate in the clerical subsample. A review of the second and third variate loadings reveals a divergence of variables loading on those variates. Again, these loadings reflect the contributions the variables have on linear combinations of those variables, which, in turn, are correlated with linear combinations of criteria variates. The criteria variates in these analyses are comprised of the contributions of multiple variables, and single variable dominance of criterion variates is the exception here. A general perusal of these canonical loadings suggests that variables that may not be typically considered when constructing performance prediction models have utility when multiple criteria are considered. For example, Openness may not be found to load on the Job Satisfaction of Job Anxiety variates for faculty, but seems to have substantial relationships with the variates correlated with variates for predicting performance for that group.

Another statistic of interest at this point is the summed squares of the canonical loadings for each variable. These indicate the relative contribution of each variable in the predictor set to the set of predictor variates. Thus, whereas a variable may not have notable relationships with any particular variates, it may still be contributing to the overall set of variates. This is especially useful in evaluating the relative contributions of predictor variables across samples. For example, Conscientiousness is accompanied with a relatively low value for summed squares of canonical loadings in the faculty subsample, but is among the higher values for the other groups. Furthermore, the loadings for Conscientiousness differ between job categories regarding the variate on which it loads heaviest. In the faculty and clerical subsamples, it loads most heavily on the performance related variate (.427 and -.618 respectively), but in the professional subsample it loads least heavily on the performance related variate (-.184).

A second application of the squared canonical loadings for the predictor variables is to avoid overemphasizing a variable that has relatively little utility in the overall model for a given job category. For example, SM has a loading of -.328 for Job Anxiety in the faculty subsample, but the summed square for SM in this subsample indicates it has the second lowest overall contribution to the predictor variates.

To this point analysis has focused on the relationships first among variate sets (via canonical correlations), and then within variate sets (via canonical coefficients and canonical loadings). This informs of the nature of what the variates themselves represent. Perhaps of greater interest is the relationship of predictor variables to criteria variates. The cross loadings and redundancy analysis offers information here. The cross loadings of the predictor variables represent the simple correlations of those variables with the associated criterion variate. The job matching model predicts there are differing linear combinations of predictors that will have utility in predicting multiple outcomes from employment relationships, and this prediction is supported by the cross loadings.

Again, returning to the faculty subsample, high cross loadings for the first variate are associated with Neuroticism and Extraversion. A high cross loading for the second variate in this subsample are associated with LOC. For the professional subsample, the high cross loadings for the first variate are associated with LOC, Agreeableness, and Conscientiousness, but there are no high cross loadings for the second variate. The Staff subsample, which has the same criteria variate dominance patterns as the faculty subsample, has high cross loadings for all but SM and Extraversion for the first variate. The second variate has high cross loadings for Agreeableness, Conscientiousness, and Extraversion. It is important to underscore that much of the advantage of multivariate analysis lies in the capacity to make these assessments simultaneously in an analytical framework that takes into account the relationships among the criterion variables. Univariate analysis (i.e., multiple regression) cannot make simultaneous assessments of such relationships, nor suggest various weighting schemes that might support various outcomes under differing strategic or organizational demands and conditions.

The redundancy analysis for the predictor sets is at the bottom of Table 4, and allows an assessment of the overall utility of the canonical correlation analyses given the samples and variables that are included. In each column, the redundancy value indicates the proportion of variance in the criterion variate accounted for by the predictor variables. These values are not representative of the contributions of the predictor variables to any particular outcome, but the a linear combination of outcome measures. There is some consistency across subsamples, but given different levels of contribution by different linear combinations of variables, the job matching model again finds support. The final value in each redundancy analysis is the summed redundancy values for each variate, and indicates the overall proportion of variance in the criteria accounted for by the predictors. It is notable that these values indicate that the predictor variables account for about 6% to 12% of the variance in the linear outcome combinations. These levels of explanation across the membership of large samples would result in substantial and measurable differences in performance, satisfaction, and anxiety which, again, are associated with job characteristics. Furthermore, the specific outcome of preference can be supported using the relative contributions as indicated by these analyses. In addition, turning to the final redundancy value for the Staff subsample, it is notable that accounting for 12% of the variance in overall combinations of performance, satisfaction, and anxiety is clearly nontrivial.

The final set of results we consider is the redundancy analyses for the relationships of criteria variables and predictor sets. These indicate the proportion of variance in the criterion variables explained by the linear combinations of predictors (i.e., variates). These values are substantially higher, largely because there are more predictor than criteria variables. The redundancy values for the first variate for each subsample indicates the predictor variates account for 7.7%, 12.9%, and 12.7% of the variance in the Performance, Job Satisfaction, and Job Anxiety in the faculty, professional, and clerical subsamples respectively.

The summed redundancy values range from approximately 16% for the professional subsample to 24% for the clerical subsample. These values suggest that 16% - 24% of the total variance in Performance, Job Satisfaction, and Job Anxiety measures is accounted for by linear combinations of predictor variables. This implies that modifications in selection decision rules can have substantial effects in supporting preferred outcomes. The variance accounted for in the summed redundancy scores suggests somewhat inflated implications because the criteria variables are represented in multiple variates. Thus, the outcome variance is not completely decomposed among the criteria variates. Obviously, one cannot employ all predictor combinations simultaneously, but the redundancy values for the criteria set are supportive of a multivariate selection and classification tool.

In summary, results support the utility of the multivariate personal- and job-characteristics matching model. The results indicate differing linear combinations of variables has the potential to influence an array of job outcomes in such a fashion as to allow selection and classification to not only be able to consider the characteristics of the persons, jobs, and outcomes that might exist, but also allow the potential to preferentially support outcomes.

## Discussion

This research is designed to investigate the notion that a multivariate approach to selection and classification can make systems more flexible and strategic, and in so doing produce better selection and classification decisions in terms of measurable outcomes. Typically, such research focuses on single criterion variables with little regard for effects on other outcomes by the predictor variables. Furthermore, a more careful analysis of the role of job characteristics in determining job outcomes for different individuals can permit a better matching of individuals to jobs. This approach has potential, therefore, to take advantage of the things individuals are best at doing, thereby increasing the quality of the outcomes beyond what can be gained from relying solely on compensation models for performance and satisfaction.

To more specifically address this issue, sets of individual and job characteristics in conjunction with three job outcomes were chosen based on theory and anticipated Navy needs. The individual characteristics used were Locus of Control (LOC), Self-Monitoring (SM), and the Big Five personality dimensions of Neuroticism, Extraversion, Openness to Experience, Conscientiousness, and Agreeableness. The job characteristics used included Autonomy, Criticality, and Routineness, and the job outcomes included Performance, Job Satisfaction, and Job Anxiety.

### Model Support

Research was undertaken using 332 employees at the University of Mississippi in three general job classifications: Faculty, professional, and clerical staff. Optimally, for this type of research, a sample of incumbents in three quite divergent types of jobs in adequate numbers to support multivariate investigations would be used. However, challenges in obtaining access to Navy personnel per the original proposal suggested an alternative sample be obtained. Given the elapsed time since the funding of the grant, and the obstacles in securing a sample that is adequate in size and job type diversity that also permits access to personnel records to garner performance and demographic information, the University sample was used. Two major issues arise with this sample. First, given the nature of the academic environment, job classifications may have more similarities than is typical in most organizations. For example, both faculty and professionals typically have higher levels of education than typically found in the general population, and representatives of both groups may have advanced degrees. Second, constraints in access to information resulted in single source data, which could produce common method biases. With these considerations, analyses progressed.

The first important finding, therefore, is that jobs can be classified according to characteristics, and these characteristics can, in turn, be used for assessing predictive validity of various selection and classification metrics. Analysis of variance supported mean differences in job characteristics for the three job classifications used in this research. Furthermore, discriminant analysis indicated that these characteristics correctly classified 58% of the individuals in the study. Given the suboptimal nature of the sample for initial investigation of these relationships, this finding seems noteworthy. The faculty subgroup self reported Autonomy as the major characteristic, the professional subgroup reported Criticality, and the clerical subgroup reported Routineness as a major characteristic.

Canonical correlations were estimated for the whole sample, and also for the faculty, professional, and clerical subgroups. This approach was used because, first, the interest is in a multivariate set of relationships among sets of predictors and criteria, and second, because the focus is on the predictive validity of the predictor sets within groups rather than across groups. The analysis for the whole sample is for purposes of contrasting between subgroups and the sample as a whole, and the discussion will focus on the subgroups.

The first step is to compare the canonical correlations of the variates to determine the overall strength of association between the predictor and criterion variates. The variates are linear combinations of the variables on that side of the multivariate regression. The composition of the variates is described using the canonical coefficients and canonical loadings (this is discussed later), and the canonical correlation is the observed correlation between the pairs of variates. This serves as an assessment of the predictor variates' contributions to the correlated sets of outcomes. That is, the linear combination of predictor variables is related to the linear combination of criteria variables to the extent they are correlated as indicated by the canonical correlation. A nontrivial correlation allows interpretations of the predictor variables' contributions to a criterion set (i.e., variate) which emphasizes a particular criterion, such as performance. The first variates in each subsample were highly correlated, with canonical correlation coefficients between .512 and .635, indicating that between 26% and 40% of the variance of one variate was accounted for by its paired variate. There are substantial differences in canonical correlation values for subsequent variate pairs, but they are generally interpretable.

The second step in the canonical correlation analysis is to consider the nature of the linear combinations comprising the criteria variates. This is accomplished by means of the standardized canonical coefficients for the criteria sets. These coefficients, similar to beta weights in regression analysis, indicate the relative contributions of the criteria variables to the criteria variate. This is analogous to the contributions of individual variables to a factor in factor analysis. Canonical variates typically are dominated by one constituent variable, and in the present study, there are both consistencies and divergences among variates and subsamples. For the faculty subsample, the three variates reflect influences of multiple variables. While there is a dominate variable, canonical coefficients indicate other variables have substantial effects. The other subsamples reflect similarly, but the coefficients show greater divergence. In addition, while the first variate for each analysis is dominated by Job Anxiety, the second variate for the faculty and staff subsamples are dominated by Job Satisfaction, while Performance dominates the second variate for the professional subsample. The lack of generally applicable rules combined with multiple effects and broadly divergent coefficient values supports one of the basic tenets of this research. That is that different job types can be characterized in terms of different combinations of job characteristics with resultant differences in outcome relationships.

This step of the analysis also offers substantial support for the fundamental premise of this research. We have held that univariate predictive models of job outcomes mask important relationships among outcomes. While univariate models may propose that outcomes are intercorrelated, the nature of that relationship likely differs among job types and job incumbents. A multivariate model that is adequately specified provides an opportunity to evaluate the collective prediction of the various predictor variables on the collection of desirable outcomes. Furthermore, such a model permits inferences about how the organization may support various outcomes by altering the weightings of the predictors that are used for selection. It clearly is advantageous to better understand the relationships among outcomes in addition to being able to predict them independently.

Turning to the relationships among predictor variables and variates, the canonical loadings present the zero order correlations of the variables to the variates they collectively comprise, and these variates are, naturally, related to criteria variates via the canonical correlation coefficients. (This latter relationship is discussed below via the cross loadings.) This information facilitates interpreting the relative contribution of the variables to the overall correlated predictor set (i.e., predictor variate). As noted in the Results, there are substantial differences between subgroups in terms of the canonical loadings. From these, inferences can be formed regarding relationships between the predictor sets and criteria sets, but will need more complete development, a point to which we return later. At this point, however, it is useful to note the variations in the retained loadings (i.e., .30 and above). Again, the first criteria variate for each subsample is dominated by Job Anxiety with varying levels of contributions of other variables included in the linear combinations. Thus, the second and third variates may be substantively different, and important feature when considering canonical loadings and cross loadings.

Reviewing the canonical loadings for the different subsamples highlights two important notions. First, the variables that are retained differ substantially among subsamples. For example, only Neuroticism loads on the first variate for both the faculty and staff subsamples. Second, and equally important for the current research, is that the linear combinations of criteria variables to which the predictors correlate suggest that the predictor sets have multiple influences, and that differing outcomes can be supported by the use of varying selection rules in accordance with the variables that load on desirable outcome criteria. For example, consider an organization having canonical correlation results such as shown in the professional subsample. If they determined a need to better support performance outcomes (as measured), a shift in selection rules to emphasize GMA and Extraversion could improve the likelihood of higher performance with no changes in job satisfaction. This notion lies at the base of the job matching model set forth earlier.

The summed squared canonical loadings of any particular predictor, such as Conscientiousness, indicates the degree to which that variable is contributing to the set of predictor variates. For example, we can sum the squared canonical loadings for Conscientiousness across the variates, and the resulting value indicates the degree to which Conscientiousness is contributing to the three variates, which in turn are predicting three correlated outcome dimensions. Summed squares of the canonical loadings does suggest that

SM is not of substantial utility for these jobs overall, despite the acceptable loading for the first variate in the faculty subsample. A review of the results indicates that there are substantial differences in the contributions predictor variables have across job categories. Future research could more clearly articulate the specific variables that may be included or excluded from the predictor sets of specific jobs. The current analyses indicates that enough differences exist to warrant such effort. For example, Agreeableness has among the lowest contributions to the predictor set for the faculty subsample, but is among the higher contributors for the other subsamples. Previous research indicates that Agreeableness has job specific predictive validities, and the same is evident here. A major difference is that, in previous research, investigators could only make such assertions based on a single outcome, with the limitation that the predictor may indeed be one of the better predictors of other outcomes for a specific job. Canonical correlation analyses can relax that limitation, as we have seen here.

The steps outlined above form the core of the analysis, and provide interpretations for three specific issues. First, we can suggest that, for a particular outcome (e.g., performance) in a particular job, a particular linear combination of these predictors are most likely to maximize that outcome given its relationships with other outcomes. Second, we can suggest that, again for this particular outcome and particular job, a particular predictor (e.g., Conscientiousness) may be relatively significant or insignificant. Thus, these two steps permit employing predictors that are likely to produce high levels of performance on selected outcomes within the context of other outcomes. If, then, there were a need to emphasize performance over other outcomes, a specific combination of predictors are likely to optimize performance. The analyses to this point tend to support further investigation of the model allowing such tactics.

In fact, the cross loadings discussed below are the product of the canonical loading and the canonical correlation for each variable and variate.

Analysis of the cross loadings further support these potentialities with more clearly articulated relationships between variables on one side (e.g., predictors) and variates on the other (e.g., criteria). The reader may recall that the cross loadings are the product of the canonical loading of a variable on a variate and the canonical correlation for that variate. In the faculty subsample, the canonical loading for GMA on the first variate is -.175, and the canonical correlation is .521. The cross loading is the product of those two coefficient, or -.091, as is observed in Table 4. The cross loadings are necessarily smaller than loadings, but offer an indication of the contribution of a variable to the variate on the other side of the equation. Both sets of cross loadings offer information. The cross loadings for the criteria sets indicates the correlation of each criteria variable with the predictor variate. Thus, the linear combination of predictor variables should be related to the specific outcome variables to the extent indicated by that correlation coefficient. A weighting method for predictor variables should then result in predictable combinations of outcomes.

Cross loadings for the predictor sets have somewhat different implications. They reflect the contribution of each individual variable to the combination represented in the criteria variate. Reviewing the cross loadings indicates successively smaller levels of contributions of individual variables across the variates because of the successively lower canonical correlations. One value of analyzing the cross loadings of the predictor sets, therefore, is to identify particular variables having notable effects, such as Conscientiousness in the staff subsample. A second value is to lessen the likelihood of overemphasizing a predictor when the levels of contribution decline due to declining canonical correlations from the first to successive variates, such as Conscientiousness in the faculty subsample. Similar differences to those demonstrated above specify a smaller set of useful predictor variables which load on the criteria variates.

The redundancy analyses suggest that nontrivial levels of variance is accounted for between predictors and criteria, to the extent that such levels of variability have potential to support dramatic effects across a sizable population. Values for redundancy analyses for the predictor sets are summed, and the resultant values indicate the level of overall contribution the predictor variables have on the criteria sets. For the subsamples, the range from .068 to .119

suggest notable contributions can be made to overall organizational outcomes using a multivariate approach. This value represents the proportion of variance in the criteria variates that is accounted for by the predictor variables. Thus, between approximately 7% and 12% of the variance in (self-reported) performance, job satisfaction, and job anxiety is accounted for by the predictor variables. This suggests a substantial contribution can potentially be made to overall organizational efficiency and effectiveness. The more thorough specification and application of this approach to specific jobs may potentially improve these values.

A final review of the canonical loadings and cross loadings in terms of what theory would predict as differential relationships among individual characteristics and job characteristics offers additional support for the utility of this research. GMA should be especially beneficial in nonroutine jobs, and thus related to satisfaction, anxiety, and performance for these jobs (i.e., related to Criticality positively and Routineness negatively), but unrelated to Autonomy dominated jobs. Results demonstrate relationships for GMA with outcomes for the professional and staff subsamples (i.e., Criticality and Routineness), with no retainable loadings for the faculty (i.e., Autonomy) subsample. External (high) LOC scores should be related to positive outcomes for Autonomy and Criticality dominated jobs, and to negative outcomes for routine dominated jobs. Findings support these relationships. High SM should reflect similar relationships as LOC, but only demonstrates utility for the first variate for the Autonomy dominated job (i.e., faculty). Extraversion should be negatively related to outcomes for Autonomy dominated jobs, as was found for the faculty subgroup.

Agreeableness should have similar relationships with Autonomy dominated jobs and positive outcome relationships for Routineness dominated jobs. It was not retained for the faculty subgroup, not supporting the theoretical relationship, but did demonstrate a relationship in the staff subsample. Openness should be related to positive outcomes for Autonomy and Criticality dominated jobs, and this relationship was demonstrated for the faculty (third variate) and professional (first variate) subsamples. Conscientiousness would be predicted to be related to positive outcomes for all types of jobs, and this was found with the caveat that only the third variate in the faculty subsample demonstrated a retainable loading. Finally, Neuroticism would be predicted to demonstrate negative outcome relationships for Criticality and Autonomy dominated jobs, and these relationships were observable in the professional and faculty subsamples, although the relationships were mixed for the latter. In summary, the results support 12 of 17 predicted relationships to varying degrees. While these do not comprise hypothesis tests or validity estimates, the trends in the data support the model relationships, suggesting further investigations are warranted.

## Limitations

There are substantial limitations to the present research which should be noted. The primary limitation is that the data are exclusively self report, with the exception of the job classifications, making the results susceptible to common method bias. This is especially of concern for self report performance data. The items used for performance information were built on concepts supported in previous research. This concern can only be addressed through subsequent research, however, we feel the findings clearly support future efforts.

A second limitation is that the jobs investigated are not of sufficient variance in characteristics or sampled in sufficient numbers to set forth clear selection rules. In addition, there is range restriction in the number of variables that could be collected for the present research, and thus the prediction models are inadequately specified. This, however, was not the intent of this research. This research is intended to demonstrate the viability of the multivariate model and interpretability of multivariate findings, which we feel has been accomplished given the common method bias potential noted above. Thus, although the sample used did not fully address design issues desirable for this research, the basic intent was addressed. It will require further research to develop these relationships and the model utility more fully.

## Future Research

The model set forth herein is demonstrated to have potential as a means to improve selection and classification when specified to the point that an adequate number of variables are determined for each job to which it might be applied. In addition, other outcome variables need to be investigated. Further research is needed to specify the model for any specific job category to which it is applied. Alternatively, research might explore validity generalization concepts as applied to job classification variables. That is, if two jobs differ in specific tasks but are classified essentially the same on key classification variables, do they also differ in selection variables? This is the issue of generalizability of the relationships demonstrated across jobs.

A third area for development, which builds on these two, is to explore how varying conditions within a job classification might affect job outcomes. It seems reasonable to expect some radio operators, for example, to function better on small vessels where they have broader responsibilities and greater autonomy, while others may be better placed on larger vessels where the job scope might be more narrow and duties more routine. This is the issue of relaxing the assumption of job classifications as the sole discriminating job characteristics variable, as was the case in the present research. It seems likely that many job characteristics are stable within job classifications, while other characteristics vary substantially. This, too, is in need of substantial further development.

## Conclusion

The research presented herein was undertaken to demonstrate the utility of a multivariate job matching model. The model illustrated relationships among sets of variables which ostensibly may be applied to selection and classification decision rules to support preferred outcomes with sufficient flexibility to allow for tactical or strategic shifts in those outcome preferences. The results support a more complete development of the model, including a specification of useful variables in the model. Further advancement of the model would then entail application of the model for various and specific job types by means of canonical correlation models for each job of interest.

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TABLE 1

Means and Standard Deviations of Job Category Variables, and F - Values for Category Differences.

| Variable | Faculty | Professional | Staff | F |
|---|---|---|---|---|
| Autonomy | 18.55<br>(3.21) | 16.40<br>(3.71) | 15.15<br>(2.92) | 22.59 |
| Routineness | 8.67<br>(4.24) | 13.10<br>(16.14) | 18.46<br>(5.97) | 63.71 |
| Criticality | 21.78<br>(4.63) | 23.79<br>(5.07) | 21.82<br>(5.12) | 6.27 |

Note: All $p < .01$

# Table 2

## Intercorrelations, Means, and Standard Deviations of All Variables with Scale Reliabilities.

| Variables | MEAN | s.d. | Educ | Sex | GMA | SM | LOC | Agree | Cons | Auton | Routine | Critic | Satis | Stress | Perf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Educ | 17.67 | 4.91 | - | | | | | | | | | | | | |
| Sex | 1.64 | .48 | -.18** | - | | | | | | | | | | | |
| GMA | 67.95 | 9.72 | .26** | -.11* | .97 | | | | | | | | | | |
| SM | 31.61 | 8.14 | -.06 | -.01 | -.01 | .89 | | | | | | | | | |
| LOC | 10.32 | 4.23 | -.10* | .21** | -.03 | .06 | .76 | | | | | | | | |
| Agree | 32.50 | 5.41 | -.04 | .21** | -.03 | -.03 | -.05 | .76 | | | | | | | |
| Cons | 34.90 | 5.39 | -.06 | .10* | -.08 | -.12* | -.10 | .23** | .79 | | | | | | |
| Auton | 16.55 | 3.58 | .17** | -.21** | .14* | .01 | -.08 | -.07 | .10 | .70 | | | | | |
| Routine | 13.53 | 6.71 | -.30** | .32** | -.21** | -.03 | .26** | .04 | .02 | -.33** | .88 | | | | |
| Critic | 22.73 | 5.06 | -.13* | -.06* | -.01 | .04 | -.12* | -.05 | .04 | .04 | -.28** | .76 | | | |
| Satis | 57.31 | 14.05 | .01 | -.03 | .00 | .02 | -.23** | .24** | .09 | .13* | -.40** | .24** | .92 | | |
| Stress | 34.14 | 9.99 | .05 | -.06 | -.04 | -.01 | .23** | -.26** | -.21** | -.03* | .02 | -.08 | -.42** | .92 | |
| Perf | 7.81 | 2.88 | .01 | .03 | -.02 | -.01 | .04 | -.09 | .08 | .02 | -.11* | .10* | -.16** | .16** | .65 |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

NOTE: Coefficient alpha internal scale reliability estimates are contained in the diagonal.

# Table 3
## Canonical Correlation Analysis Results.

| WHOLE SAMPLE | | | | |
|---|---|---|---|---|
| Canonical Correlations | | | eigenvalue | |
| 1 | 0.467 | | 0.218 | |
| 2 | 0.255 | | 0.065 | |
| 3 | 0.210 | | 0.044 | |
| Standardized Canonical Coefficients for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | 0.148 | -0.985 | 0.223 | |
| Job Satis. | 0.293 | -0.330 | -1.030 | |
| Job Anx. | -0.854 | -0.176 | -0.699 | |
| Standardized Canonical Coefficients for Predictor Set | | | | |
| | 1 | 2 | 3 | |
| GMA | 0.059 | 0.062 | -0.119 | |
| LOC | -0.363 | -0.107 | 0.611 | |
| SM | 0.213 | 0.116 | 0.232 | |
| Agree | 0.342 | 0.607 | -0.411 | |
| Cons | 0.190 | -0.325 | 0.496 | |
| Neu | -0.527 | -0.260 | -0.715 | |
| Extra | 0.130 | -0.957 | -0.417 | |
| Open | -0.308 | -0.151 | 0.155 | |
| Canonical Loadings for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | -0.043 | -0.955 | 0.293 | |
| Job Satis. | 0.641 | -0.076 | -0.764 | |
| Job Anx. | -0.958 | -0.192 | -0.211 | |
| Canonical Loadings for Predictor Set | | | | Summed |
| | 1 | 2 | 3 | Squares |
| GMA | 0.040 | 0.055 | 0.042 | 0.006 |
| LOC | -0.545 | 0.018 | 0.418 | 0.472 |
| SM | 0.043 | 0.045 | 0.111 | 0.016 |
| Agree | 0.559 | 0.313 | -0.261 | 0.479 |
| Cons | 0.472 | -0.261 | 0.447 | 0.491 |
| Neu | -0.768 | 0.049 | -0.376 | 0.734 |
| Extra | 0.493 | -0.735 | -0.263 | 0.852 |
| Open | -0.135 | -0.187 | 0.108 | 0.065 |

| FACULTY | | | | |
|---|---|---|---|---|
| Canonical Correlations | | | eigenvalue | |
| 1 | 0.521 | | 0.271 | |
| 2 | 0.428 | | 0.183 | |
| 3 | 0.288 | | 0.083 | |
| Standardized Canonical Coefficients for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | -0.706 | -0.140 | -0.723 | |
| Job Satis. | 0.347 | 0.704 | -0.676 | |
| Job Anx. | 0.754 | -0.519 | -0.477 | |
| Standardized Canonical Coefficients for Predictor Set | | | | |
| | 1 | 2 | 3 | |
| GMA | 0.138 | -0.345 | 0.326 | |
| LOC | -0.365 | -0.838 | 0.227 | |
| SM | -0.295 | 0.196 | 0.030 | |
| Agree | 0.471 | 0.264 | 0.390 | |
| Cons | -0.140 | -0.131 | 0.502 | |
| Neu | 0.859 | -0.287 | -0.121 | |
| Extra | -0.421 | -0.228 | -0.558 | |
| Open | 0.073 | -0.136 | -0.591 | |
| Canonical Loadings for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | -0.656 | -0.329 | -0.679 | |
| Job Satis. | 0.294 | 0.843 | -0.451 | |
| Job Anx. | 0.577 | -0.696 | -0.428 | |
| Canonical Loadings for Predictor Set | | | | Summed |
| | 1 | 2 | 3 | Squares |
| GMA | -0.175 | -0.283 | 0.150 | 0.133 |
| LOC | -0.127 | -0.842 | 0.205 | 0.767 |
| SM | -0.328 | -0.085 | 0.035 | 0.116 |
| Agree | -0.015 | 0.240 | 0.216 | 0.104 |
| Cons | -0.106 | 0.046 | 0.427 | 0.196 |
| Neu | 0.763 | -0.452 | -0.132 | 0.804 |
| Extra | -0.506 | -0.005 | -0.427 | 0.438 |
| Open | 0.058 | -0.189 | -0.594 | 0.392 |

| PROFESSIONAL | | | | |
|---|---|---|---|---|
| Canonical Correlations | | | eigenvalue | |
| 1 | 0.512 | | 0.262 | |
| 2 | 0.297 | | 0.088 | |
| 3 | 0.212 | | 0.045 | |
| Standardized Canonical Coefficients for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | 0.094 | -0.990 | 0.291 | |
| Job Satis. | 0.421 | -0.466 | -0.980 | |
| Job Anx. | -0.745 | -0.215 | -0.848 | |
| Standardized Canonical Coefficients for Predictor Set | | | | |
| | 1 | 2 | 3 | |
| GMA | 0.062 | -0.475 | -0.447 | |
| LOC | -0.317 | -0.230 | 0.265 | |
| SM | 0.029 | 0.084 | -0.184 | |
| Agree | 0.414 | 0.599 | -0.560 | |
| Cons | 0.000 | -0.276 | 0.676 | |
| Neu | -0.445 | -0.072 | -0.493 | |
| Extra | 0.202 | -0.812 | -0.385 | |
| Open | -0.522 | -0.019 | 0.096 | |
| Canonical Loadings for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | -0.155 | -0.916 | 0.369 | |
| Job Satis. | 0.760 | -0.115 | -0.639 | |
| Job Anx. | -0.932 | -0.181 | -0.314 | |
| Canonical Loadings for Predictor Set | | | | Summed |
| | 1 | 2 | 3 | Squares |
| GMA | -0.033 | -0.458 | -0.361 | 0.341 |
| LOC | -0.460 | -0.053 | 0.145 | 0.235 |
| SM | -0.123 | 0.034 | -0.314 | 0.115 |
| Agree | 0.610 | 0.340 | -0.233 | 0.542 |
| Cons | 0.469 | -0.184 | 0.580 | 0.590 |
| Neu | -0.684 | 0.205 | -0.316 | 0.610 |
| Extra | 0.497 | -0.646 | -0.200 | 0.704 |
| Open | -0.388 | -0.176 | -0.142 | 0.202 |

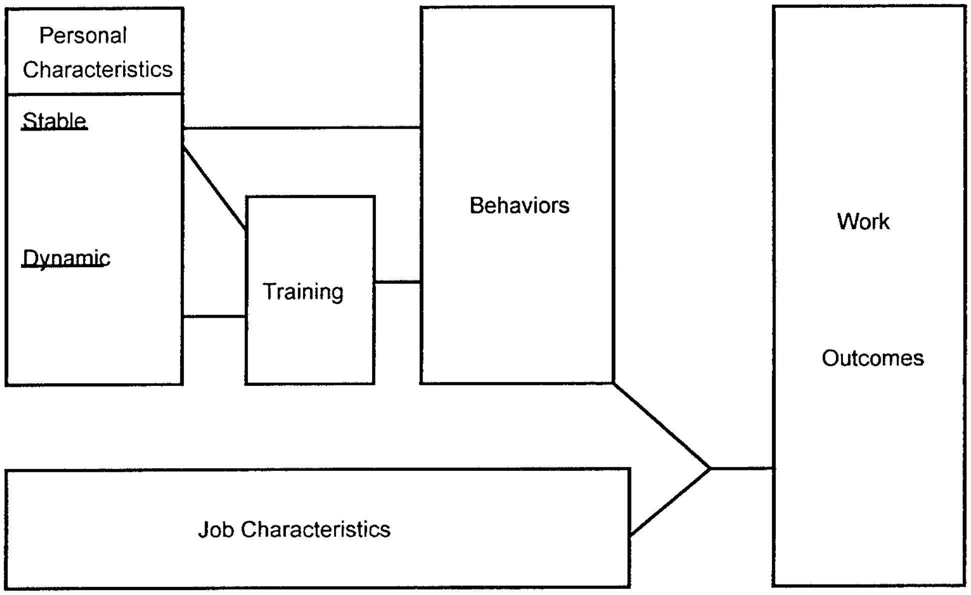
| STAFF | | | | |
|---|---|---|---|---|
| Canonical Correlations | | | eigenvalue | |
| 1 | 0.635 | | 0.403 | |
| 2 | 0.461 | | 0.213 | |
| 3 | 0.350 | | 0.123 | |
| Standardized Canonical Coefficients for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | -0.133 | -0.621 | -0.795 | |
| Job Satis. | -0.417 | -0.833 | 0.656 | |
| Job Anx. | -1.099 | 0.074 | 0.328 | |
| Standardized Canonical Coefficients for Predictor Set | | | | |
| | 1 | 2 | 3 | |
| GMA | 0.337 | 0.153 | 0.282 | |
| LOC | -0.058 | 0.363 | 0.245 | |
| SM | 0.490 | -0.065 | 0.328 | |
| Agree | 0.158 | -0.141 | 0.382 | |
| Cons | 0.043 | -0.451 | -0.769 | |
| Neu | -0.777 | -0.303 | -0.297 | |
| Extra | -0.095 | -0.663 | 0.205 | |
| Open | 0.175 | 0.391 | -0.569 | |
| Canonical Loadings for Criteria Set | | | | |
| | 1 | 2 | 3 | |
| Perf | -0.278 | -0.504 | -0.817 | |
| Job Satis. | 0.125 | -0.792 | 0.598 | |
| Job Anx. | -0.924 | 0.361 | -0.128 | |
| Canonical Loadings for Predictor Set | | | | Summed |
| | 1 | 2 | 3 | Squares |
| GMA | 0.395 | 0.323 | 0.088 | 0.268 |
| LOC | -0.361 | 0.344 | 0.110 | 0.261 |
| SM | 0.284 | 0.082 | 0.276 | 0.164 |
| Agree | 0.322 | -0.462 | 0.366 | 0.451 |
| Cons | 0.316 | -0.478 | -0.618 | 0.710 |
| Neu | -0.748 | 0.208 | 0.131 | 0.620 |
| Extra | 0.190 | -0.738 | 0.057 | 0.584 |
| Open | 0.451 | 0.317 | -0.475 | 0.530 |

# Table 4
## Cross Loadings and Redundancy Analysis.

| WHOLE SAMPLE | | | | | FACULTY | | | | | PROFESSIONAL | | | | | STAFF | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross Loadings for Criteria Set | | | | | Cross Loadings for Criteria Set | | | | | Cross Loadings for Criteria Set | | | | | Cross Loadings for Criteria Set | | | | |
| | 1 | 2 | 3 | | | 1 | 2 | 3 | | | 1 | 2 | 3 | | | 1 | 2 | 3 | |
| Perf | -0.020 | -0.244 | 0.062 | | Perf | -0.342 | -0.141 | -0.196 | | Perf | -0.079 | -0.272 | 0.078 | | Perf | -0.177 | -0.233 | -0.286 | |
| Job Satis. | 0.299 | -0.019 | -0.161 | | Job Satis. | 0.153 | 0.360 | -0.130 | | Job Satis. | 0.390 | -0.034 | -0.135 | | Job Satis. | 0.079 | -0.365 | 0.209 | |
| Job Anx. | -0.448 | -0.049 | -0.044 | | Job Anx. | 0.300 | -0.297 | -0.124 | | Job Anx. | -0.477 | -0.054 | -0.067 | | Job Anx. | -0.587 | 0.167 | -0.045 | |
| Redundancy | 0.097 | 0.021 | 0.011 | 0.128 | Redundancy | 0.077 | 0.079 | 0.024 | 0.180 | Redundancy | 0.129 | 0.026 | 0.010 | 0.164 | Redundancy | 0.127 | 0.072 | 0.043 | 0.242 |
| | | | | | | | | | | | | | | | | | | | |
| Cross Loadings for Predictor Set | | | | | Cross Loadings for Predictor Set | | | | | Cross Loadings for Predictor Set | | | | | Cross Loadings for Predictor Set | | | | |
| | 1 | 2 | 3 | | | 1 | 2 | 3 | | | 1 | 2 | 3 | | | 1 | 2 | 3 | |
| GMA | 0.019 | 0.014 | 0.009 | | GMA | -0.091 | -0.121 | 0.043 | | GMA | -0.017 | -0.136 | -0.077 | | GMA | 0.251 | 0.149 | 0.031 | |
| LOC | -0.255 | 0.005 | 0.088 | | LOC | -0.066 | -0.360 | 0.059 | | LOC | -0.236 | -0.016 | 0.031 | | LOC | -0.230 | 0.159 | 0.039 | |
| SM | 0.020 | 0.012 | 0.023 | | SM | -0.171 | -0.037 | 0.010 | | SM | -0.063 | 0.010 | -0.067 | | SM | 0.181 | 0.038 | 0.096 | |
| Agree | 0.261 | 0.080 | -0.055 | | Agree | -0.008 | 0.103 | 0.062 | | Agree | 0.312 | 0.101 | -0.049 | | Agree | 0.205 | -0.213 | 0.128 | |
| Cons | 0.221 | -0.067 | 0.094 | | Cons | -0.055 | 0.020 | 0.123 | | Cons | 0.241 | -0.055 | 0.123 | | Cons | 0.201 | -0.220 | -0.216 | |
| Neu | -0.359 | 0.012 | -0.079 | | Neu | 0.398 | -0.193 | -0.038 | | Neu | -0.351 | 0.061 | -0.067 | | Neu | -0.475 | 0.096 | 0.046 | |
| Extra | 0.230 | -0.188 | -0.055 | | Extra | -0.264 | -0.002 | -0.123 | | Extra | 0.255 | -0.192 | -0.042 | | Extra | 0.121 | -0.341 | 0.020 | |
| Open | -0.063 | -0.048 | 0.023 | | Open | 0.030 | -0.081 | -0.171 | | Open | -0.199 | -0.052 | -0.030 | | Open | 0.287 | 0.146 | -0.166 | |
| Redundancy | 0.046 | 0.006 | 0.004 | 0.056 | Redundancy | 0.034 | 0.025 | 0.009 | 0.068 | Redundancy | 0.055 | 0.009 | 0.005 | 0.069 | Redundancy | 0.069 | 0.036 | 0.013 | 0.119 |

Figure 1

Job- and Personal-Characteristics Placement Model.


Personal
Characteristics
Stable
Dynamic
Training
Behaviors
Work
Outcomes
Job Characteristics